



## **DRILLING HEAD WITH PROTECTIVE SCREEN**

### **FIELD OF THE INVENTION**

**[0001]** The present invention relates to earth drilling machines having an extraction of the drilled material through an outer sleeve by injecting a pressurized air/water flow. More particularly, the present invention relates to the discharge of the drilled material and of the extraction air/water during operation of an earth drilling machine.

### **BACKGROUND OF THE INVENTION**

**[0002]** Drilling machines are known and are structured to obtain vertical or horizontal holes in the ground.

**[0003]** Said machines are provided with a drill head which is coupled to a driver under the head[.,] and which drives the drill rod and an outer tube (sometimes called sleeve) surrounding the drill head.

**[0004]** The drill rod is rotated by a motor and is pushed downwards by a translation mechanism called head carriage.

**[0005]** More particularly, the drill rod is typically hollow and allows the passage of air and/or water pumped under pressure inside said rod, thus obtaining a removal of the ground drilled. As a result of the pressure received from the compressor or a water pump, the air/water and the soil drilled rise to the ground surface by traveling between said drill rod and said sleeve and are then discharged from an upper aperture between the inner driver and the outer driver.

**[0006]** The upper aperture of the sleeve coupled to the driver, from which the drilling air/water is discharged together with the soil drilled, is located near the rotating head, which moves down along a slide by means of a head carriage.

**[0007]** During drilling the head, and therefore the drivers, are disposed above the ground.

**[0008]** The air/water under pressure and the soil drilled are discharged from the upper aperture, between the inner driver and the outer driver, spraying the resulting slurry around, flooding and dirtying machinery situated nearby and the surrounding area (which is a nuisance if drilling takes place near boundaries or other constructions), soaking and dirtying persons in areas near the drilling machine.

### **SUMMARY OF THE INVENTION**

**[0009]** In order to overcome the above-mentioned drawbacks, a new drill head provided with a protective screen has been designed and constructed.

**[0010]** It is an aim of the new drill head with protective screen is to contain the jet of air/water and drilled soil.

**[0011]** It is another aim of the new drill head with protective screen **[[is]]** to convey the jet of water and drilled soil in a pre-set direction or area.

**[0012]** It is a further aim of the new drill head with protective screen **[[is]]** to prevent, or in any case considerably limit, dispersion of the air/water and drilled soil in the area surrounding the drilling machine.

**[0013]** It is still another aim of the new drill head with protective screen **[[is]]** to prevent accidents to persons caused by the spreading of the air/water and drilled soil in areas surrounding the drilling machine.

**[0014]** These and other aims, direct and complementary, are achieved by the a drill head constructed according to the principles of the present invention and provided with a protective screen, which includes at least two connection and adjustment supports and a screen panel.

**[0015]** The connection and adjustment supports are applied to the drill head motor, while the screen panel is applied and connected to said supports.

**[0016]** The connection between panel and supports is such **[[as]]** to permit the adjustment of the position of said panel on said supports, both laterally, moving it away

from or near to the drill rod, and parallel to the drill rod, thus covering or exposing the area of the driver apertures.

**[0017]** Said panel of the new screen conveys the water and the soil that are drilled and discharged between the inner driver and the outer driver to a circumscribed or in any case controlled area.

**[0018]** During drilling the screen is lowered to the height of the driver apertures, while for maintenance the screen is raised with respect to the apertures of said drivers.

**[0019]** Appropriate mechanical-electrical-hydraulic devices provide for the translation of the screen parallel to the drill rod.

**[0020]** The characteristics of the new drill head with protective screen will be illustrated in greater detail in the following description, making reference to the drawings attached as a non-limiting example.

#### BRIEF DESCRIPTION OF THE DRAWINGS

**[0021]** FIG. 1 is a top view of the head including the motor of the drill rod, with plates and a screen panel applied to the drill head.

**[0022]** FIG. 2 is a front elevational view of a protective screen according to an embodiment of the invention applied to the drill head.

#### DETAILED DESCRIPTION OF THE INVENTION

**[0023]** Briefly, the rotating shaft (B), housed in and fixed to the drill head, is screw-connected to the inner driver (T1) of the drill rod (A). The inner driver (T1) is connected to the outer driver (T2) of the drill sleeve (C).

**[0024]** The protective screen comprises at least two connection supports (P), which can be applied to the drill head, and a screen panel (S).

**[0025]** Each of said connection supports (P) is provided with at least one pneumatic-hydraulic piston or other translation device (Pa) for application, fixing and adjustment of the screen panel (S).

**[0026]** Said translation device (Pa) is positioned parallel to the axis of the shaft (B), or parallel to the drill rod (A) and to the sleeve (C).

**[0027]** The screen panel (S) basically consists of a generically U-shaped metal sheet (S1), in one single element or several elements, or in any case bent and shaped in order to cover and envelop the drivers (T1, T2) and the rotation shaft (B) on three sides. The inner part of the metal sheet (S1) is provided with connection elements (Sa) for application, connection and adjustment to the translation devices (Pa) of the connection supports (P).

**[0028]** The screen panel (S) is applied to said translation devices (Pa) of said connection supports (P) in order to envelop and cover the shaft (B) and the drivers (T1, T2) on at least three sides.

**[0029]** During connection and disconnection of the head to/from the drill rod (A) and the sleeve (C), the translation devices (Pa) of the protective screen keep the screen panel (S) raised (position shown in FIG. 2) for easy access to the parts to be connected. Throughout the drilling operation, said translation devices (Pa) move the screen panel (S) downwards or towards the drill tip (FIG. 2, position shown by a broken line), thus aligning it with and covering the gap between drill rod (A) and the sleeve (C) where the air/water and drilled soil are discharged.

**[0030]** The water and drilled soil that are discharged from the sleeve (C) encounter the screen panel (S) which retains them and conveys them to the base of the drill rod or towards a pre-set point/direction.

**[0031]** The connection devices (Sa) of the screen panel (S) permit adjustment of the position and angle-direction of said screen panel (S) according to the specific position of the drill rod and the items present in the area around the drilling site.

**[0032]** Therefore, with reference to the preceding description and the attached drawings, the following claims are expressed.